



Review Article

Community-Based Cardiac Rehabilitation To Improves Medication Adherence in Stable Coronary Artery Disease

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ABSTRACT

Cardiovascular disease contributes to 48% of deaths in the world. A cohort study at the Harapan Kita National Heart Center and 5 Indonesia hospitals in 2006 showed that the death rate due to heart disease in hospitals was around 6-12%. Rehospitalization rate reached 29% and the all-out expense of INA-CBG claimed for inpatient was Rp 42.4 trillion. The major problem causing rehospitalization was poor compliance to medication in coronary artery disease (CAD) patients. Education to improve compliance has been known not only reduced rehospitalization rate but also improve quality of life. In these review the author discussed the efficacy of community based cardiac rehabilitation for rehospitalisation reduction dan quality of life improvement.

1. Introduction

Cardiovascular disease is a major cause of disability and premature deaths worldwide and contributes substantially to increase in health care costs.¹ Previous study suggested high mortality dan rehospitalization rate lead to high cost paid by national insurance in Indonesia, spending almost half of total insurance budget.^{2,3} The major daily practice heart disease problem faced by clinician is coronary artery disease. Up to now, the main therapy for stable coronary artery disease was optimal medical treatment, except persistent symptom on daily activity patient should be sent to revascularization, as recommended by the cardiology guidelines. Revascularization, with PCI (Percutaneous Coronary Intervention) or CABG (Coronary Artery Bypass Graft), is more effective in treating angina, reducing the consumption of anti-angina drugs, and improving exercise capacity and quality of life, compared to medical treatment strategies alone.⁴ Community-based cardiac rehabilitation interventions, which consist of education about risk factor and pathogenesis of the disease, complications, medication, side effects and adherence of the drugs, lifestyle changes, self-monitoring, modification of risk factors and lifestyle behaviors, physical activity, weight loss, alcohol consumption, and psychosocial factors, all have been suggested as an important issues whether could reduce mortality and morbidity in patients with stable coronary artery disease.^{1,5,6}

2. Cardiac Rehabilitation on Stable Coronary Artery Disease

The components of cardiac rehabilitation are physical activity counseling, sports training, diet/nutrition counseling, weight control management, fat management, blood pressure monitoring, smoking cessation, and psychosocial management.⁷

After a cardiac event, any index and before starting with an exercise program, it will be optimal for the patient to have a symptom-limited exercise tolerance test (for example, an exercise training test). Information obtained from exercise tests is needed to develop appropriate sports prescriptions and are useful for guiding the patient's return to work or home or recreation activities. For these patients, prescription exercises must be carried out conservatively with close supervision. The intensity of the exercise must be guided by rating of perceived exertion (RPE) 11-14 and titrated to provide the most efficacious program while maintaining patients within their physical limitations and below the threshold of their symptoms.⁸

Generally recommended that patients who have experienced cardiovascular events start from the lower end of their exercise intensity (40% -60% heart rate reserve [HRR] or 11-13 on the RPE scale). Typically, a cardiac rehabilitation session consists of a 5-10 minutes warm-up and cooling period in addition to the aerobic exercise phase. This heating and cooling phase must include stretching, range of motion, and low-intensity aerobic activity.⁸

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Subsequent to heating up and before the cooling period of cardiovascular recovery or exercise preparing, the high-impact stage is finished and should include preparing enormous muscle bunches through cadenced exercises, for example, strolling, biking, or stationary paddling. On account of the advantages of explicit preparing for the exercises completed, the two legs and arms should be prepared. The term of the high-impact stage must be expanded dynamically to in any event 30 minutes and afterward the time permits, it ought to be titrated as long as an hour for each meeting. Preferably, the number of activities per meeting ought to be done pretty much each day of the week. The power of activity is likewise expanding, as endured, up to 80% HRR. Oxygen consuming interim preparing utilizes practice force around 90% - 95% of pinnacle HR (80% - 90% HRR) for short interims of around 4 minutes, mixed with 3-minute times of low-power work out (60% - 70% of pinnacle HR, 40% - half HRR) for recuperation purposes. Isometric exercise is not suggested among patients with coronary disease in view of the potential for noteworthy increments in systolic and diastolic pulse.

Dynamic moderate-power work out (characterized as half - 60% of one most extreme redundancy [1-RM]) brings about improved solid quality and perseverance, the two of which are significant for security in coming back to day by day life exercises, diversion, and non-engaging exercises, and look after autonomy. Higher intensity (80% of 1-RM) endurance training has also been shown to be well tolerated and effective in increasing physical strength and function in elderly people with coronary heart disease. The endurance training program that is generally recommended involves doing a set of 8-10 regional exercises that are carried out 2-3 days per week. Typically, these programs involve starting with a mild intensity and continuing for 10-15 repetitions. While resistance training is 50% -80% of 1-RM, the rate of product pressure (RPP) must not exceed those specified for endurance training, and the perceived exertion must remain between 11 and 14 on the Borg scale.⁸

Circadian rhythms also play a role, because the ischemic threshold is found to be lower at 1 pm than at 8 am and 9 pm. Forearm vascular resistance increases at 8 am and 9 pm compared to 1 pm, suggesting that increased vascular resistance may be one of the causes of angina threshold variability. However, for certain patients who carry out certain activities at the same time that day, there seems to be reproducibility in the RPP where angina occurs. Therefore, one goal for patients with angina is to carry out daily routine activities on RPP that are below their ischemic threshold, thereby reducing the amount of angina and fatigue they experience. An exercise program for patients with angina or those with myocardial infarction requires that they identify and understand their symptoms first. Specifically, individuals must be able to identify the nature of their angina (eg location, precipitating factors, related symptoms, and radiation patterns) and understand that no clinical benefit is obtained from exercising with such discomfort or pain.⁸

In cardiac rehabilitation settings, it is not uncommon for patients who regularly experience angina at a relatively low workload (for example 2 MET) to take one sublingual nitroglycerin about 15 minutes before starting warm-up. This practice usually allows patients to exercise in a way that is pain-free and the workload is slightly higher. Also, it might be useful to include a longer warm-up (≥ 10 minutes) to help minimize or avoid ischemia.

The American College of Sports Medicine (ACSM) recommends for intensity in phase-1 cardiac rehabilitation among post-myocardial infarction patients including, training patients for heartbeats 120 beats/min, guided by symptoms of chest pain and dyspnea (Borg rank) perceived activity <13 , and interval training with exercises that last from three to five minutes or within tolerance, interspersed with periods of rest sufficient to achieve a 2: 1 exercise/rest ratio. After the

occurrence of ACS, phase-1 cardiac rehabilitation is important to help the patient recover.⁸

The position paper from ESC on cardiovascular recovery in auxiliary anticipation makes proposals with respect to the time and power of physical preparation after acute myocardial infarction (AMI) and in cardiovascular breakdown patients. In uncomplicated AMI, ambulation must start following 12 to 24 hours (Class I recommendation); Physical preparation before returning home can start in the medical clinic after an electrocardiogram load test. Patients with great exercise limits can continue physical action for 30 to an hour consistently at 75% to 80% of pinnacle pulse. After broad or muddled dead tissue with cardiovascular breakdown, stun, or arrhythmia, the patient must keep up bed rest for more and physical movement must start simply after adjustment. Patients with left ventricular systolic failure must be tried for top exercise limits with the greatest maximal cardiopulmonary exercise test, and physical preparation ought to be proceeded slowly at half of the most extreme exercise limit in the emergency clinic to confirm clinical averageness and security. Day by day moderate-power practice after hospitalization is prescribed.⁹

An arrangement-based outpatient program that is checked in the post-usable period. Patients practice for 3-4 times/week for an entirety of 36 gatherings for 3-4 months for stage 2 cardiac rehabilitation program. A profound established help program without supervision, not checked by an ECG where physical wellbeing and reduction of additional danger factors are underscored, at any rate, a half year after cardiovascular event for stage 3 of cardiac rehabilitation program. During this stage, practice plans become closer to those recommended for adults. A slow outpatient heart restoration program that covers all parts of hazard factor alteration through way of life, administered exercise, and care turns into a significant piece of the recovery procedure planned for expanding the patient's utilitarian limit and diminishing cardiovascular hazard factors.⁹

FITT proposals on outpatient programs, Frequency: Exercise must be accomplished for at any rate 3 days, however, ought to be done pretty much each day of the week. The recurrence of activity relies upon a few components including essential exercise resilience, practice power, wellness, and other wellbeing objectives, and the kind of activity remembered for the general program. For patients with restricted exercise limit, a few short day by day meetings (1-10 minutes) can be endorsed. Patients ought to be urged to do a portion of these instructional meetings autonomously (that is, without direct supervision). Force: Based on the consequences of the essential exercise test, 40% - 80% of the activity limit utilizes the hold beat (HRR) strategy, oxygen take-up (VO 2 R), or pinnacle oxygen take-up (VO 2 pitch), RPE 11-16 on a size of 6-20. The power of the activity must be resolved on the beat underneath the ischemic limit; for instance, <10 beats, if such an edge has been resolved for the patient. The nearness of old-style angina pectoris that is instigated by exercise and lost with rest or nitroglycerin is adequate proof for the nearness of myocardial ischemia. Time: 5-10 minutes of warming and cooling exercises, including static, extending, ROM, and light power (ie, $<40\%$ VO 2 R, $<64\%$ top pulse [HRpeak], or <11 RPE) oxygen consuming movement, must be a part of each instructional meeting and go before and follow the molding stage. The objective for the term of the oxygen-consuming molding stage is commonly 20-an hour for every meeting. After cardiovascular occasions, patients can begin with just 5-10 minutes of vigorous molding with a steady increment in oxygen consuming activity time of 1-5 minutes for each meeting or an expansion in time for every meeting of 10% - 20% every week. Type: The high-impact practice area of the meeting ought to incorporate the movement of enormous cadenced muscle bunches with an accentuation on expanding calorie consumption for keeping up a sound weight and numerous other related medical advantages. To improve physical wellness all through the body, molding that incorporates the upper and lower furthest points.⁸

Patient education, according to the American Heart Association / American College of Cardiology (AHA / ACC) guidelines, it is recommended that patients be educated about proper cholesterol management, blood pressure, smoking cessation, and lifestyle management. The most favorable BMI range in healthy men who have never smoked concerning prognosis is between 23.5 and 24.9 kg / m² and in women between 22.0 and 23.4 kg / m². A collaborative analysis of 57 prospective studies with 900,000 people reached the same conclusion from optimizing a BMI between 22.5 and 25 kg / m². In a randomized study of The Survival and Ventricular Enlargement (SAVE) in post-ACS patients with left ventricular dysfunction, shows that stopping tobacco is associated with a 40% reduction in causes of death and 30% of deaths due to recurrent IMA or repeated IMA or death due to heart failure.

Cardiac rehabilitation at the hospital for 4 weeks could be useful in patients with severe left ventricular dysfunction or relevant comorbidities. All other patients could begin with outpatient cardiac rehabilitation immediately after discharge from the hospital and must be continued in the following weeks and months. This outpatient cardiac rehabilitation program could be set as hospital or community base.¹⁰ Community-based cardiac rehabilitation interventions have also been developed to improve patient adherence to guideline recommendations with better impact on achieving goals.⁶

There was a decrease in hazard mortality about 10.4% to 7.6% for patients after ACS and revascularization who receive cardiac rehabilitation program. In another survey of 33 RCT and 4,740 patients with cardiovascular disease reported that sports-based heart restoration decreased the general burden of hospitalization.¹¹

3. The impact of cardiac rehabilitation to psychology and metabolic status

The impact of adding psychosocial interventions to standard-based cardiac rehabilitation exercises was reported contributed to a greater reduction in psychological pressure, increases in systolic blood pressure and serum cholesterol reported in a meta-analysis of 23 RCT. There was a 40% reduction in depressive symptoms after cardiac rehabilitation training exercises, which was reported by a recent observational study in the United States of 189 heart failure patients (left ventricular ejection fraction <45%). This study also suggested that depressed patients who completed their cardiac rehabilitation had 59% lower of mortality rate compared to who did not underwent cardiac rehabilitation.¹¹

The previous study also reported a significant reduction in systolic blood pressure, body mass index, serum triglycerides, HDL cholesterol, total cholesterol, blood glucose, and peak oxygen uptake in the high-calorie exercise group and high activity with cardiac rehabilitation program.¹²

4. Community-based cardiac rehabilitation intervention

An outpatient intervention was defined as a treatment that occurred in an outpatient cardiac rehabilitation clinic with similar components as in-home treatment. Intervention components included some combination of heart health care management and/or education, counseling, exercise, or tele health care. Usual care-control components typically were standard medical care that may have included a physician and/or specialist nursing care and heart education.¹³

Research conducted by Dalal and Evans reported that patients after myocardial infarction who were given the choice turned out to prefer home / community-based cardiac rehabilitation rather than hospital-based, and of those who chose it as much as 87% completed their program.¹⁴ A few patients, in any case, esteem the

open door for peer backing and this may improve their take-up and adherence. Network-based gathering programs offer this chance and early assessments have revealed upgrades in practice levels and decreases in angina like those announced by medical clinic-based projects. Gathering meetings permit patients to tune in to addresses that are asked by others and which they might be too hindered to even consider improving.¹⁵

The diverse instructive mediations expand the wellbeing education of people and found to respectably improve medicine adherence by expanding their insight into their conditions, confusions, and the board.⁵ Early programs consisted of exercise training, whereas now a comprehensive approach is recommended, including assessment of risk factors, psychological and educational interventions, risk factor correction, stress management, and relaxation training, and delivered by a multidisciplinary group according to national standards.¹⁵

18 RCT showed low to direct quality proof on the upgrades in medicine adherence with instructive mediations.⁵ Through training, wellbeing education is improved, in this way improving prescription adherence. The reason for teaching patients with the information and attention to settle on choices and assume liability of their prescriptions is to upgrade a people comprehension and trust in their capacity to deal with their conditions and improve their wellbeing proficiency, which thusly is straightforwardly proportionate to increasingly ideal illness the board, more prominent inclusion in self-care and better clinical results.⁵

5. Summary

Taking everything into account, the mediation to upgrade cardiovascular restoration conduct among patients with myocardial localized necrosis found that despite the fact that they utilized different approaches to support patient's conduct just as various procedures for development, the outcomes show a huge improvement in wellbeing conduct and the intercessions (instructive mediation, upgrading self-adequacy, and self-administration conduct) were successful for persistent who partake in heart recovery after cardiovascular occasions. The term of intercession can impact the result toward the finish of the program on account of the time span for mediation can rouse the patient in keeping up conduct per the cardiovascular restoration programs.

6. Declarations

6.1. *Ethics Approval and Consent to participate*
Not applicable.

6.2. *Consent for publication*
Not applicable.

6.3. *Availability of data and materials*
Data used in our study were presented in the main text.

6.4. *Competing interests*
Not applicable.

6.5. *Funding source*
Not applicable.

6.6. *Authors contributions*
Idea/concept: TA. Design: TA. Control/supervision: MSR, CT, SW. Data collection/processing: TA. Extraction/Analysis/interpretation: TA, MSR, CT, SW. Literature review: TA, MSR, CT, SW. Writing the article: TA. Critical review: MSR, CT, SW, AR. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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